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ABSTRACT

This is a general descriptive and comparative report on alternative forms of library catalogs. The specific problems and factors associated with library catalogs are introduced briefly and then treated with respect to the following physical forms: card catalogs, book catalogs, microforms, and on-line catalogs. Whenever possible, examples of existing catalog systems are cited. An attempt is made to identify major cost factors of each physical form relative to production, maintenance, and use. In addition, potential effects of the various catalog forms on a decentralized library system are considered. (CH)

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ALTERNATIVE PHYSICAL FORMS FOR LIBRARY CATALOGS:

CARD

BOOK

MICROFORM

ON-LINE

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

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A working paper prepared for
the Subcommittee on the Future
of the Catalogs, by Barbara A.Nozik.
University of California, Berkeley
July, 1974.

IR 003 412

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INTRODUCTION

The library catalog exists in a dynamic environment of major and minor, but continuous change. Thus, one catalog record may be altered, or all records, or any number between these extremes, given a single specific modification in cataloging practices. In addition to these changes in form and content, the catalog is constantly changing in size with the addition of new records, withdrawals of old ones, and the updating of existing records - a continuous process.

There are various reasons why the huge card catalogs of our large research libraries are becoming increasingly unsatisfactory. Files have become excessively large, making them difficult to maintain and to search. Card catalog cabinets are consuming more and more of the limited available space. Perhaps most important, however, is the fact that older, larger catalogs tend to become rigid and increasingly inhospitable to change, even highly desirable change.

With LC copy constituting a larger and larger basis for the total cataloging output of U.S. research libraries, any significant change in LC practice has an immediate and far-reaching effect on the catalogs of libraries all over the country. During the remaining years of this decade, LC hopes to accomplish several major cataloging programs: (1) the abandonment of superimposition; (2) the expansion of MARC distribution service to most of its cataloging, including foreign language material; (3) a revision of its filing rules, making them more readily adaptable to computer requirements; and (4) a revision of its subject heading structure with improved distribution service. The first of these, the abandonment of superimposition, is imminent, having been scheduled for 1975.

Faced with these prospective changes and the difficulty of incorporating them into existing catalogs, some large research libraries are contemplating closing off their old catalogs and establishing new catalogs reflecting new rules and practices. Yet, one cannot assume that once these new practices are implemented, they will not undergo modifications with the passage of time. Eventually, we may be faced with some of the same difficulties in revising the "new" catalog, as we had with the old. Then, do we look to a "newer" catalog, a third generation, a fourth, etc? Meanwhile, if we anticipate developing new catalogs or continuing present ones, a crucial question to be considered is the adaptability of the catalog form to change.

As part of its study, the Committee on the Future of the Catalogs has investigated the principal alternative physical forms in which the bibliographic records of a library can be stored and displayed. At the present time, these forms are card, book, microform, and on-line catalogs.

The selection of the "best" form of catalog for a particular library is dependent on: (1) determining the library's needs and financial capabilities; (2) knowing the forms available, their characteristics, advantages, and

limitations; and (3) relating the library's needs to each of these forms. This working paper deals with the second of these considerations. It is hoped that it may prove useful as a means of stimulating the Library staff to think about and compare their present card catalogs with other possible forms. It may be of interest, also, as an introduction to the subject for the staffs of other research libraries who are exploring the future of their catalogs.

With this audience in mind, the Committee has prepared a general descriptive and comparative report on alternative forms of catalogs. This paper does not attempt to evaluate production techniques of specific types of equipment relative to quality of output, or to provide cost estimates. An attempt has been made, however, to identify the major cost factors of each physical form relative to production, maintenance, and use. It is assumed that detailed cost analyses will be prepared at a later date when needed. Because the Berkeley General Library contains at least twenty-five separate public catalogs, in addition to the Main Library Author-Title and Subject catalogs, the potential effects of the various forms on a decentralized system are considered.

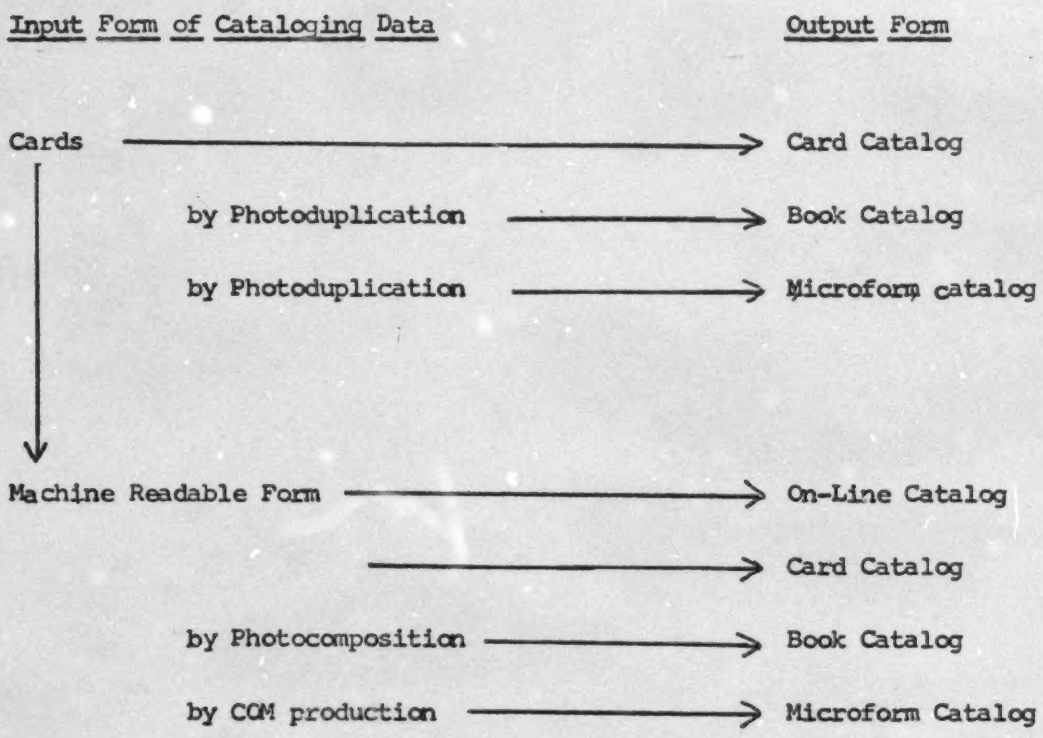
The contents of this paper consists first of a general characterization of each of the physical forms. The second section focuses on specific problems and factors associated with library catalogs. Each factor is introduced by a brief discussion, then treated with respect to each of the physical forms. Cross references are provided to related sections. Whenever possible, examples of existing catalog systems are cited. The report is designed to enable one to read any section independently of the rest, if desired; therefore, considerable repetition is necessary to assure that each section can stand by itself.

Books and articles by authors whose opinions and studies are cited in the body of the report, are listed in the bibliography at the end.

The Committee is not yet prepared to make recommendations regarding the most desirable form of catalog for the University of California at Berkeley until other aspects of this study have been completed.

Figure 1.

DVEVLOPMENT OF VARIOUS CATALOGS FROM CATALOGING DATA ON CARDS OR IN MACHINE READABLE FORM



SECTION I

DESCRIPTION

OF DIFFERENT FORMS

OF LIBRARY CATALOGS:

CARD

BOOK

MICROFORM

ON-LINE

DESCRIPTION OF DIFFERENT FORMS OF LIBRARY CATALOGS

CARD CATALOGS

This physical form is familiar to the majority of library patrons and staff; hence, no training in the operation of equipment is required. Bibliographic information is printed, typed, or photocopied on cards of uniform size. An average of one title is recorded per card. Cards are filed in prescribed order, on edge, in drawers and the drawers are stored in cabinets. The storage and use space required by card catalogs is extensive; the rate of expansion is relatively rapid.

There are two principal sources for cataloging copy: (1) Library of Congress: Printed cards are available directly from LC; cards may also be produced by photocopying Depository Catalog cards, by enlarging and duplicating National Union Catalog entries, or from MARC tapes: (2) Local original cataloging: Cards are reproduced from typed originals. In a decentralized system, catalogs in branch and department libraries may contain, in addition to those described above, cards for titles cataloged locally in the branch or department. These may or may not be duplicated in the central catalog of the system's main library; if they are, the central catalog may be considered a complete union catalog for the system.

This catalog is current relative to the staff's processing speed. It is updated by accretion, (i.e., by filing new and revised entries, pulling withdrawals, etc.) Cards and drawers may be shifted for expansion purposes, but no in toto revision is necessary.

Major Cost Factors:

(1) Equipment and facilities: Storage cabinets, Storage space.
(2) Materials: Card stock.
(3) Labor: Maintenance of card catalog, Typing, sorting, and filing, Creation and maintenance of authority files.
(4) The catalog card occupies the same volume within the drawer whether the card contains one or more lines of bibliographic information. Hence, the amount of bibliographic information included for one entry is not a cost factor as long as it is limited to one card.
(5) The above costs are multiplied in decentralized systems with many catalogs.

Example: Present card catalogs at UCB.

BOOK CATALOGS

Although this physical form of the catalog is familiar to only some library patrons and staff, the form of a book is familiar to all, and requires no training in the operation of equipment. Bibliographic information is recorded on pages of books. Because of the relatively small storage space occupied by a book catalog, it may be considered flexible for placement purposes. Hence, this form has been found particularly useful by systems with decentralized services or multiple

DESCRIPTION OF DIFFERENT FORMS... (Continued)

Book Catalogs... (cont.)

service points. A large section of the alphabet may be contained in one volume of the catalog; therefore, multiple copies must be made available to accommodate many users simultaneously.

Production methods involve the following techniques: (1) Photoduplication of catalog cards. (2) Computer processing: Direct computer printout or photocomposition. Photocomposition of cards is useful mainly for reproducing (or closing off) retrospective catalogs; whereas, the dominant production method for current catalogs is by computer. In addition, computer programs can be developed which can quickly produce bibliographies and branch catalogs, as well as generate and maintain authority files from the machine readable data base.

There are two principal sources of cataloging copy: (1) Library of Congress printed cards (for the photoduplicated catalog) and MARC tapes (for the photocomposed catalog) (2) Local original cataloging.

Book form catalogs are out-of-date as soon as printed and must be updated by current supplements, cumulations, and/or periodic in toto revisions. In between supplements and cumulations, there may be a need for an interim record of newly processed titles in some form.

Major Cost Factors: (a) For the Photoduplicated catalog:

(1) Equipment and facilities: Filming and processing equipment or commercial service contract.
(2) Materials: Printing and binding, usually contracted out.
(3) Labor: Usually the card catalog is already in existence. However, cards may be edited if desired.

Major Cost Factors: (b) For the Photocomposed catalog:

(1) Equipment and facilities: Computer time and input devices or commercial service contract.
(2) Materials: Printing and binding, usually contracted out.
(3) Labor: Programming (a single time process); keyboarding and editing.
(4) Typography significantly affects production costs; hence, the amount of bibliographic information included per entry here is a major cost factor.

Examples: (1) Photoduplication of catalog cards: G.K.Hall catalogs, e.g., UCB Author-Title Catalog, 1962; Southern Illinois University Libraries.
(2) Direct computer printout: UC Santa Cruz Library Catalog (1968)
(3) Photocomposition: New York Public Library. Dictionary Catalog of the Research Libraries, 1971-; UC Union Catalog Supplement, 1963-1967; Baltimore County Public catalog.

MICROFORM CATALOG

This form of catalog is familiar to relatively few library patrons and staff, although many are acquainted with books and serials in microform. Therefore, there may be a need to train patrons and staff to use reader equipment. Microform, as used in relation to catalogs here, is the generic term for microfilm, microfiche, ultrafiche, and COM products which are either microfiche or microfilm.

Microfilm can be a roll of either positive or negative microphotographic film. A microfilm catalog may be in reel, cartridge (single core) or cassette (two cores) form. The reel film must be manually threaded by the user unless it is "locked in" a self-contained reader system. The cartridge device has a guide and feed mechanism for use in motorized (automatic) readers. After use, the film must be completely rewound before the cartridge is removed from the reader. (Microfilm cartridge is different from audio-visual cartridge which can be removed at any time without rewinding.) The cassette device has a guide and feed mechanism and provides for automatic rewinding of film. The cassette may be removed from the reader without rewinding.

The use of cartridge and cassette containers helps to keep films clean; however, film is still subject to wear. Since these containers can be labeled or color coded, they are not as subject to misfiling as are individual fiche. Containers require more storage space than reel film and must be compatible with whatever reader equipment is used.

Microfiche resembles the catalog card in shape, but is of film and contains representation of many cataloged documents on one sheet; the entry at the top of the fiche is human readable. Fiche can be stored in opaque envelopes in protective boxes or cabinets, or may be inserted in cartridges. Also cartridges are used for ultrafiche (reduction 90X and above) files which are "locked in" the self-contained reader system.

Special reader equipment is required when reading from microfilm or microfiche. A variety of readers, at a wide range of prices, are available. These may have one or more of the following features: (1) printing device, (2) adaptable lenses for reading a variety, but not all, possible reductions, (3) adaptability to both microfilm and microform input, (4) manual threading or self-threading mechanisms for cartridge or cassette containers, (5) manual or motorized (automatic) accessing of file, (6) stable focus, (7) automatic turn-off.

In addition, there are self-contained (also called locked-in or dedicated) microfilm or ultrafiche systems. In these systems, the microfilm or ultrafiche cartridge is "locked in" the reader; thus, the user need never touch the film or fiche. This self-contained system may be automatically accessed, thereby lessening the amount of equipment manipulation required of the user. The fiche system may require a double look-up process: (1) the user refers to an external index for an identifying number for the fiche, then (2) keys in the number to locate the fiche. This system, which resembles a jukebox in operation, may make use of a minicomputer or program tape within the reader.

Microform catalog ... (cont.)

For a large catalog file, several self-contained readers, each dedicated to a portion of the file, may be necessary. As for the standard readers, a large part of the alphabet may be contained on one fiche or roll of film; hence, to relieve congestion in times of peak use, multiple copies and readers may be necessary. The microform catalog is considered flexible for placement purposes, (i.e., it may be located in branches, offices or stacks). Because of its relatively low cost and small space requirements, this form has been found useful by systems with decentralized services or multiple service points.

Some technological problems associated with microform catalogs are related to standardization of micrographics, (e.g., quality of the film, as well as frame sizes and reduction ratios), and to the clarity of images of readers.

There are two principal sources of catalog copy: (1) LC printed cards (for photoduplication catalog) and MARC tapes (for the COM produced catalog). (2) Local original cataloging.

The Computer Output Microform (COM) process involves the conversion of machine readable data to microfilm or microfiche output. The COM unit converts digital information from a computer either directly to film or to an image on a cathode ray tube. The image on a cathode ray tube is then photographed, and the microfilm output is subsequently developed. The microform output may be used as is, or it can be used to produce printed catalog cards and book form catalogs. The machine readable data base may be used in the development of bibliographies and branch catalogs, as well as in the production and maintenance of authority files.

Microform catalogs are out-of-date as soon as filmed and must be updated with current supplements, cumulations, and possible periodic in toto revisions. In between supplements and cumulations, there may be a need for an interim record of newly processed titles in some form. To maintain the durability of the film, at least the archival copy of the catalog should be stored in protective boxes or cabinets in which the relative humidity is controlled.

Major Cost Factors: (a) For the Photoduplicated catalog:

(1) Equipment and facilities: Filming and processing equipment or commercial service contract; special storage cabinets; readers, space occupied by multiple readers.
(2) Materials: The cost of the film is related to the size of the file, which is usually based on a per frame cost. Cartridges and cassettes for microfilm and jackets and cartridges for microfiche are additional one-time expenses.
(3) Labor: Staff may be required to handle fiche or film for users, or to train users.

Microform catalog... (cont.)

Major Cost Factors: (b) For the COM produced catalog:

(1) Equipment and facilities: Computer time and input devices, filming and processing equipment, or commercial service contract; Special storage cabinets; readers, space occupied by multiple readers.
(2) Materials: See section on Photoduplicated catalog above.
(3) Labor: Programming (a single time process), keyboarding and editing. Also see section on Photoduplicated catalog above.
(4) The amount of bibliographic information per entry is also a major cost factor.

Examples: (1) Microfilm catalogs: University of Missouri Library, Illinois State Library.
(2) Microfiche catalogs: Ramapo Catskill Library System (NY) subject catalog of 178 fiche (60,000 subject entries); Georgia Institute of Technology Library retrospective author, title, subject, and series dictionary catalog of 717 fiche (750,000 titles, 1100 entries per fiche).
(3) COM produced catalogs: University of Missouri with COM supplements to the microfilmed catalog: Georgia Institute of Technology microfiche supplement (new catalog) with 6000 entries per fiche; Washington University School of Medicine Library Catalog (25 microfiche versus 1500 page direct computer printout).
(4) Self-contained, automatically accessed, microfilm system: NYPL Dance Collection (in test mode).

ON-LINE CATALOG

An on-line catalog is a less familiar device to library staffs and patrons than the other physical forms. Hence, training is required in both the operation of equipment and the use of the query program. Computer programs can be developed to provide instruction and aid to users.

Bibliographic information is stored in machine readable form on magnetic disks. Access to catalog data may be by typewriter terminal or cathode ray tube terminal (CRT) which is a TV screen with a keyboard. On-line systems appear to provide "instant" access (real time) to the information; also several users may use the computer at what appears to be the same time (time sharing). Besides the CRT display, hardcopy of the computer's responses may be produced either on-line or off-line; in the former process, a printing device accompanies the CRT unit; in the latter process, the printing unit which accompanies the computer prints during low use hours.

At present, computer catalogs cannot accommodate non-Roman alphabets; hence, the information must be transliterated before it can be converted into maching readable form. While computer programs can sort and file quickly and consistently, they cannot handle, without complex algorithms, the conversion filing rules as does the human who utilizes implicit information.

DESCRIPTION OF DIFFERENT FORMS...(Continued)

On-Line Catalog ... (cont.)

This system is more susceptible to periodic breakdowns than are the other available forms. However, a well-designed system will have back-up procedures to allow operations to continue, when possible. But, if the computer is not functioning (is "down"), this may mean the entire system does not function.

With an on-line system, it may be possible to consolidate into a single record all the present various catalogs and files of the library, e.g., acquisition records, circulation records, author-title catalog, subject catalog, branch catalogs, shelf list. This consolidated file would then be available at one location, (i.e., the whole file may be accessible from each on-line terminal).

The principal sources of cataloging copy include (1) Library of Congress MARC tape distribution services, as well as LC printed cards and (2) local original cataloging. Data can be input, as well as corrected, on-line; other input methods include keypunching and keytaping. The use of the Optical Character Recognition device (OCR) to read source documents, such as catalog cards, is still fraught with technological problems--primarily, the inability to handle every kind of type font and handwriting. Computer programs can be developed which can quickly produce bibliographies and branch catalogs, as well as produce and maintain authority files.

This form of the catalog is more current, depending on staff's processing speed, than the other available forms. Periodic creation of back-up files on tape or disk is required.

Major Cost Factors:

(1) Equipment and Facilities: Computer time, input devices, telephone lines, user terminals, space occupied by terminals.
(2) Labor: Programming (a single time process); keyboarding and editing. Software (program) is expensive to develop. Although packaged programs are available, they usually have to be modified. In addition, staff may be required to train and help users.
(3) The amount of bibliographic information per cataloged document affects the storage and access costs.

Examples: (1) IBM Los Gatos Library has an on-line catalog for users and staff.
(2) Stanford University BALLOTS system for technical processing. Several on-line BALLOTS catalog files are available for public use now at a fee.
(3) Ohio College Library Center on-line technical processing system.

SECTION II

PROBLEMS AND FACTORS

ASSOCIATED WITH LIBRARY CATALOGS

AND THEIR RELATIONSHIPS

TO THESE PHYSICAL FORMS

USEFULNESS OF LC CATALOGING DATA BASES AS INPUT IN CATALOG PRODUCTION

The usefulness of the numerous LC cataloging data bases in the production of catalogs of various physical forms is presented here.

Sources of LC and NUC Cataloging Data:

1. LC printed cards and proof slips are available for material cataloged from 1901 forward.

2. The author and subject catalogs of the Library of Congress - National Union Catalog series. (For scope of this series see: "National Union Catalog: We answer some queries", ALA BULLETIN, Jan. 1969, p. 39-41).

3. Cataloging - in - publication.

4. MARC tapes include the following materials: (however, this is not an inclusive list)

   a) English languages from 1968 forward.
   b) French language from 1973 forward.
   c) Serials from 1973 forward (all Roman alphabet current cataloging).
   d) Popular titles from 1940-1967 (16,000 titles reflecting the most frequently requested cards).
   e) Roman alphabet current cataloging (to be funded as of fiscal year, 1974).

The following are factors to be considered when selecting the type of LC cataloging data base to be used in catalog production:

1. Cost of purchasing the data base.

2. Cost of processing the data base: (e.g., special software is required to handle the MARC II records).

3. Cost of retrieval of cataloging information from the data base.

4. Necessity of converting the data base into another physical form for use in the production of the catalog.

5. Amount of information in each data base which will be used by the particular library (i.e., because it is costly to maintain a complete MARC file, it is necessary to make a decision relative to merging or purging the data base).

6. Scope of each data base.

7. Timeliness of each data base, (i.e., the availability of cataloging data for material being processed).

LC CATALOGING DATA BASES...continued

See related sections: PRODUCTION COSTS, UPDATING AND FILE MAINTENANCE

The following sections contain examples of the ways in which the various types of LC cataloging may serve as input in catalog production.

CARD CATALOG

1. LC printed card sets, with or without modification, are available for filing into the catalog. (UCB)

2. Depository catalog cards may be xeroxed to produce catalog cards. (UCB)

3. Cards may be produced by enlarging and photoduplicating National Union Catalog entries. (UC Davis)

4. Cards may be produced by computer batch process from MARC tapes. (OCLC)

5. Cards may be produced from the LC microfiche data (MCRS) via a reader-printer and subsequent photoduplication of the master copy. (UC Davis)

BOOK CATALOG

1. LC printed cards can be photoduplicated. (UCB, LC-NUC author-subject catalog series)

2. MARC tapes are available for computer produced book catalogs by photocomposition techniques. (NYPL catalog, Washington State Library Register Catalog, National Agricultural Library catalog)

MICROFORM CATALOG

1. LC printed cards are converted by photoduplication and reduction to microfilm. (University of Missouri catalog)

2. LC printed cards are converted by photoduplication and reduction to microfiche. (Georgia Institute of Technology retrospective catalog)

3. MARC tapes are available as input to COM production techniques to develop microfiche or microfilm catalogs. (Georgia Institute of Technology current catalog)

LC CATALOGING DATA BASES... continued

ON-LINE CATALOG

1. MARC tapes may be input for on-line technical processing system. (OCLC; Stanford University Ballots project).

2. LC cataloging copy information may also be input on-line, or off-line by keyboarding or OCT techniques.

CATALOG PRACTICES AND LIBRARY NEEDS

In this section, the following factors are considered relative to each form: (1) the size of the library collection, (2) filing rules, (3) amount of bibliographic information per entry in the catalog, and (4) the availability of various catalog by-products such as: bibliographies, branch catalogs, special collection catalogs, authority files, indexes. See related section: PRODUCTION COSTS.

CARD CATALOG

1. Collection size:

   Libraries of all sizes have card catalogs.

2. Filing rules:

   Cards are filed (a process using sorting and conversion rules) by people, according to rules which can be ignored or misinterpreted. People are slower, less accurate, and less consistent than computers. However, people can cope better with conversion filing rules, because they utilize implicit information.

3. Amount of bibliographic information per entry:

   The catalog card occupies the same volume within the drawer, whether it contains one line of information or more. The redundancy of bibliographic information under various added entries does not increase costs, unless each entry requires multiple cards.

4. By-products:

   The production of additional files and catalogs is dependent upon the cards being manually pulled and sorted.

BOOK CATALOG

1. Collection size:

   According to Piternick and Tauber, the majority of book catalogs are found in libraries with collections of less than 1,000,000 titles,

CATALOG PRACTICES...continued
Book Catalog

and in public libraries in which collections are periodically weeded. (The photoduplicated G.K. Hall book catalogs of research library collections generally serve as supplementary, not unique, records of holdings.) However, at least one major research library, the New York Public Library, is dependent on a photocomposed book catalog for its record of acquisitions since 1972.

2. Filing rules:

For the photoduplicated catalogs, the problems associated with human filing, as described above in the CARD CATALOG section, also apply here. For the photocomposed book catalogs, however, the software must accommodate the filing rules with algorithms to the greatest extent possible. Because many entries are visible on a page at one time, filing errors may be more readily apparent than in the card catalog.

3. Amount of bibliographic information per entry:

For the photoduplicated book catalog, the amount of bibliographic information included on each original catalog card does not affect the cost, unless an entry requires multiple cards. For the photocomposed book catalog, production costs are related to the amount of information per entry. Hence, there is a need to balance legibility with compactness of format. Therefore, representation of full bibliographic information under all added entries and subject headings may be eliminated for cost reasons.

4. By-products:

If the catalog is photoduplicated, then the production of additional files and catalogs requires manual pulling and sorting of catalog cards. If the catalog is photocomposed, these by-products may be readily prepared from the machine readable data base. In addition, bibliographic information in machine readable form may be transformed into other forms such as card, microform, on-line, as well book.

MICROFORM CATALOG

1. Collection size:

Microform catalogs are found in large and small libraries. At the present time, however, no large research library appears to be dependent solely on a microform catalog for public use.

2. Filing rules:

For the photoduplicated catalog, the problems associated with human filing, as described in the CARD CATALOG section above, also apply here. For the COM produced catalog, the problems associated with computer filing apply. (See ON-LINE below.)

CATALOG PRACTICES...continued
Microform catalog

3. Amount of bibliographic information per entry:

For the photoduplicated microform catalog, the amount of bibliographic information included on each original catalog card does not affect production costs, unless multiple cards are required for an entry. However, for the COM produced catalog, the representation of full bibliographic information for added entries and subject headings may be eliminated for cost reasons.

4. By-products:

If the catalog is photoduplicated, then the production of additional files and catalogs requires manual pulling and sorting of catalog cards. If the catalog is produced by COM techniques, the above-mentioned by-products may be readily prepared from the machine readable data base.

ON-LINE CATALOG

1. Collection size:

Theoretically, an on-line catalog should be able to accommodate any collection size by use of secondary storage equipment, such as tape, drum, disk.

2. Filing rules:

For a single entry CRT display, filing rules are not necessary to the system. However, for a display of more than one entry at a time, the problems associated with computer filing are relevant. Cartwright: While the computer can sort quickly and consistently, it cannot handle conversion rules as would a human who utilizes implicit information. However, algorithms may be developed to accommodate some conversion rules. Filing "accuracy" may be enhanced by increasing the size of the sort field (number of characters); however, this results in increased computer time.

3. Amount of bibliographic information per entry:

The costs of storage and access are related to the amount of bibliographic information per entry, as well as the number of entries.

4. By-products:

Information in machine readable form can be readily sorted to produce various types of catalogs. In addition, information in machine readable form can be transformed to other forms such as card, book, microform, as well as on-line. Also, the installation of an on-line system provides terminals which may be used to query other available data bases, such as ERIC, MEDLINE.

DURABILITY

The durability of the data base storage media, as well as the auxillary access equipment has both internal and external aspects. The internal aspect includes factors such as rate of wear and mechanical breakdowns under "normal" use conditions, as well as planned obsolescence and obsolescence due to rapid technological changes. The external aspects of durability refer to damage imposed by the user, (e.g., arson, theft, and vandalism, including erasure or alteration of information), and the environment, (e.g., fire, temperature, relative humidity, air pollution, and dust). If the catalog is periodically revised in toto, then durability of the storage media may not be a significant factor. However. the archival master-copy should exist in a durable form. In the past, microform catalogs served primarily as insurance measures against damage to the card catalog. See related sections: USER ORIENTATION AND EASE OF USE, UPDATING AND FILE MAINTENANCE.

CARD CATALOG

1. Durability of storage media under normal use:

   Because the card catalog is not revised in toto, and because restoration of cards is an expensive undertaking, the durability of the card stock is important, as well as that of the print. Xeroxed cards may be more susceptible to smudging.

2. User and environmental imposed damages:

   Cards may easily be stolen or defaced. Trays may be dumped.

3. Detection of destroyed records:

   It is usually difficult to detect missing catalog cards, as well as to replace them once detected; hence a back-up file may be necessary.

BOOK CATALOG

1. Durability of storage media under normal use:

   The durability of the paper stock and binding materials may not be a crucial factor if the book catalog is frequently revised in toto. If no revisions are anticipated, then acid-free paper stock and strong binding will be required.

2. User and environmental imposed damages:

   Volumes may be stolen, pages ripped or torn out, and binding damaged. In addition, book pages may be considered defaced if changes. such as corrections, deletions, and additions are made by hand.

3. Detection of destroyed records:

   Obliterated entries, ripped pages and stolen volumes are usually

DURABILITY...continued
Book catalog

readily discernable. Back-up files for the photoduplicated catalog may be in the form of cards and/or film; for the photocomposed catalog, tape and/or film.

MICROFORM CATALOG

1. Durability of storage media under normal use:

   The durability of microfilm (silver halide film is considered the most durable) is contingent on production control, as well as storage and handling procedures. The need for durable film is related to the updating technique, (i.e., whether new fiche or film is added or whether the catalog is revised periodically in toto). Reader equipment is subject to mechanical failure, as well as technological obsolescence.

2. User and environmental imposed damages:

   Microform is subject to bending, sensitive to scratches and abrasions and prone to theft and loss. Cartridges and cassettes, as well as the self-contained system serve a protective function. In addition, microfilm is sensitive to humidity, temperature, and air pollution. Reader equipment is also subject to damage by inept users; hence, an adequate maintenance and repair system is required. Service contracts and, in some cases, repair kits for minor problems are available. The equipment, particularly the screen, must be kept clean and dusted.

3. Detection of destroyed records:

   Damaged and lost sections of the microfilm catalog are usually readily detected. However, fiche are easily misplaced in large files, and misfiled fiche are difficult to detect. The back-up duplicate of the catalog can be readily produced when the public catalog is being developed. The master fiche or film copy should be stored in a non-public place in protective cabinets.

ON-LINE CATALOG

1. Durability of the storage media under normal use:

   Historical files on magnetic tape have to be rewritten at regular intervals. Periodic computer system breakdowns occur; thus, system back-up provisions such as manual procedures, computer printouts, etc., must be available. The magnetic disk may be damaged by the read-write head. Terminals may be subject to technological obsolescence, as well as mechanical failures. Hence an adequate maintenance and repair system (service contract) is required.

2. User and environmental imposed damages:

DURABILITY...continued
On-line catalog

Inept users may damage terminals. Terminals, particularly, the CRT screen, must be kept clean and dusted. Though it may be possible for users to erase or alter the data base, this system is less subject to this kind of damage than other forms. Magnetic tapes and disks are subject to wear and environmental damage.

3. Detection of destroyed records:

Altered or erased data may not be readily detected. Back-up files on tape or disk as an insurance measure against both record damage and system breakdowns are necessary.

USER ORIENTATION AND EASE OF USE OF THE CATALOGS

The term "user" refers to both patrons and staff of the library. Both need to know something about the cataloging practices and rules of the library, (e.g., filing rules, syntactic structure of multiple word subject headings, form for subdivisions, form for main entries, etc.), in order to make effective use of the catalog, regardless of its physical form. According to the studies of Bates and Kochen, the success of a search in the catalog is related more to one's familiarity with cataloging practices than with the subject matter of the query.

In addition to understanding cataloging rules, users must be able to utilize any access equipment associated with the catalog, e.g., microform reader-printers, on-line terminals. The following factors must be considered relative to the orientation of users: (1) Who will use the catalog, patrons and/or staff? (2) Will staff be required to monitor the use of the equipment and data base? (3) Will training for all new users and retraining for infrequent users be continuously required, i.e., Does the library serve a relatively stable or a constantly changing clientele? (4) What, if any, antipathy toward the use of equipment is anticipated? The younger generation will probably be more familiar with various reader devices and also less resistant to using mechanical devices than the present generation. (5) If the public catalogs exist in more than one physical form, how confusing will this situation be to users?

Now, assume that the patrons and staff have acquired both knowledge of cataloging practices and skills in using any necessary access equipment. Then, given this skilled and knowledgable user, consider how easy it may be to use the catalog relative to the following aspects:

1. The problem of access to the data base pertains to the flexibility of location of the data base within the institution, access to it from other locations, as well as feasibility of providing multiple copies in a single location.

2. Searching ease is related to the following factors which may either function as searching aids or searching hindrances: (a) the number of possible alphabets to be searched for a single title, (b) the number of entries simultaneously displayed, (c) the amount of bibliographic information included with each entry, (d) the number and kinds of available access points, (e) the possibility of using more than one access point at a time in the search process (In a Boolean search, one may use one or more access points, such as author's name, title, publication date, subject headings, size of volume, etc., which are coordinated by "and" and "or" operators in a single search.), and (f) legibility of the displayed information. At present, little is known about the comparative time required to search in different physical forms of the catalogs. Finally, as an aid in catalog searches, adequate workspace and lighting must be provided.

3. The ease of obtaining hardcopy output of the displayed bibliographic information relates to whether the user must handcopy the information, whether the reader equipment provides the hardcopy, or whether one must wait for it, i.e., a batch mode computer output.

See related sections: ACCESS COSTS, DURABILITY, AND SPACE REQUIREMENTS.

USER ORIENTATION...continued

CARD CATALOG

1. User orientation:

   This physical form is familiar to all patrons and staff; thus, no training in the operation of equipment is required.

2. Access to the data base:

   The central or "union" catalog is usually found in only one location within an institution. The telephone can enhance access to it from other locations, if sufficient telephone lines and trained staff to serve it are made available.

3. Searching ease:

   To locate a particular type of entry (author, subject, etc.) there is usually only one alphabet to search, unless there are separate retrospective and current card catalogs. In order to use the catalog most effectively, users should be familiar with the filing rules.

   Only one entry is visible at a time, which may or may not retard searching speed.

   Full bibliographic information is usually found under all entries - main, added, subject. Thus, even if the user, searching for a known item, has inaccurate author and/or title information, the additional bibliographic information on the card may be useful in identifying the desired item. Also, the search for a single title may be a one-step process in the majority of cases, because the user, who approaches the catalog with an added entry only, does not have to refer back to the main entry for additional bibliographic information. (An exception to this in the UCB catalog is the necessity of checking under main entry for location of all copies and all editions of the work in the system.)

   Various access points may be provided in the card catalog, but the logistics of using more than one access point at a time presents difficulties in maneuvering trays.

   Smudges, particularly on call numbers, are troublesome. Xeroxed cards appear to smudge more easily than other cards.

4. Hardcopy output:

   To obtain hardcopy representation of bibliographic information, patrons must usually handcopy the information, unless special arrangements are made for photocopying. Staff may, however, be allowed to xerox cards.

BOOK CATALOG

1. User orientation:

   This physical form of a book is familiar to all library patrons and

staff; hence, no training in the operation of equipment is required.

2. Access to data base:

Individual volumes of a book catalog are portable, depending on size and weight. In addition, because of the relatively small storage space occupied by a book catalog, it may be considered flexible for purposes of placement, or many copies may be placed in a single location. This catalog form has been found particularly useful by systems with decentralized service or multiple service points.

3. Searching ease:

To locate a single title, there may be more than one alphabet to search, if there are supplementary lists for updating. In order to use the book catalog most effectively, users should be familiar with the filing rules.

Many entries on a page are visible at a time which may facilitate quick recognition in comparison with the card catalog's single visible entry.

Usually full bibliographic information is provided under all entries in the photoduplicated catalog; whereas in the photocomposed catalog, it may be provided under one entry only. The effect of this on searching, discussed in the CARD CATALOG section, pertains here also.

Various access points may be available in the book catalog. However, the logistics of using more than one access point at a time presents difficulties in maneuvering book volumes.

If legibility is sacrificed for compactness, this may hinder the searching process.

In his timing study on the manual searcing of catalogs, Aubry found that slightly more time was spent in searching the same items in a book catalog as in a card catalog.

4. Hardcopy output:

Patrons and staff may readily obtain hardcopy representation of bibliographic information by xeroxing the pages of the book catalog.

MICROFORM CATALOG

1. User orientation:

While this form of the catalog is familiar to relatively few library patrons and staff, many are acquainted with books and serials in microform. However, there may be a need to train patrons and staff to use reader equipment. Such training, depending on the equipment involved, may require learning to insert reel, cartridge or cassette devices; to cope with self-threading failures; and to avert damage to equipment, such as by stripping gears or tearing film; in addition

USER ORIENTATION...continued
Microform catalog

to locating and focusing the desired image. Self-contained microform systems minimize the amount of equipment manipulation required on the part of the user. In an academic setting, with a constant turnover of students, there may be a continuous need to train users, as well as retrain the infrequent users. In addition, user resistance to microform is strong, perhaps greater than reported in the literature or by groups with a vested interest in microform products.

2. Access to data base:

A microform catalog is considered flexible relative to its location, (i.e., it may be permanently located in branches, offices, or stacks, or wherever reader equipment is available), because of its low cost and relatively small storage space requirements. Also multiple sets may be provided at a single location.

3. Searching ease:

To locate a single title, there may be more than one alphabet to search, if there are supplementary lists for updating. In order to use the catalog more effectively, users should be familiar with the filing rules.

Many entries may be visible at a time, which may facilitate quick recognition in comparison with the card catalog's single visible entry.

Usually full bibliographic information is provided under all entries in the photoduplicated catalog, whereas in the COM produced catalog, it may be provided under one entry only. The effects of this on searching are discussed in the CARD CATALOG section.

Various access points may be available, but only one may be used at a time in a single search.

The clarity of the visual image displayed by microform readers is often subject to criticism. Users performing extended bibliographical searches may suffer from eyestrain while reading a moving image or centering images, as well as backstrain.

4. Hardcopy output:

Patrons and staff may obtain hardcopy representation of bibliographic information, if microform reader-printers are available. Patrons may be required to pay for this service, as they do for xeroxed material. Otherwise, workspace must be available in order to handcopy the information.

ON-LINE CATALOG

1. User orientation:

A catalog, accessed through terminals, is a less familiar device to

USER ORIENTATION...continued
On-line catalog

library staff and patrons, than the other physical forms. Training is required in both the operation of terminal equipment, and the use of the query program. A program may be developed that can both train and aid users; however, while this may reduce the amount of staffing required for training purposes, it will not obviate the need for this service. In an academic setting, with a constant turnover of students, there may be a continuous need to train users, as well as retrain infrequent users. Library experience with on-line terminals is still very limited. So far, there is little evidence of user resistance to them comparable to that for micro-form.

2. Access to data base:

Access to the data base may be a typewriter terminal or cathode ray tube terminal which may be located in remote areas, (i.e., remote from the main computer). In addition, copies of the data base on tape or disk may be sent to institutions which have access to a computer. However, it may be necessary for the subscribing institution to modify the data base to accommodate its computer system.

3. Searching ease:

Here there is no problem of having to search multiple alphabets, nor is there a need for users to be familiar with filing rules.

One or more entries may be visible at a time.

Full bibliographic information for each title may or may not be provided. If it is provided, then it can usually be displayed from any access point, if the program so permits.

Every item of bibliographic information may be a potential access point, although this feature may be tempered by cost. It is also possible, if so programmed, to coordinate various access points in a single search, i.e., a Boolean search. Thus, this catalog may provide both a variety and a multiplicity of access points.

Users may encounter problems with eyestrain and backstrain with prolonged use, as in performing extended bibliographic searches.

4. Hardcopy output:

Patrons may obtain hardcopy representation of information either on-line or off-line (batch mode) depending upon the type of terminal and available software. Patrons may be charged for this service, as they are for xeroxing.

PRODUCTION COSTS

In this section, the major cost factors in the production of initial copies of catalogs, as well as the duplication of catalogs are considered. Duplicate copies may serve as replacements, back-up files, and as catalogs for other locations or institutions. When providing duplicate copies of the catalog, one must consider who is to pay for their production and distribution (handling, mailing and shipping), the producer or the subscriber?

The major cost factors in catalog production involve the cost of the media itself, special storage equipment, and the cost of recording the data on the media. These costs are divided in this section as follows: Equipment and facilities, Materials, and Labor. Complete and accurate comparative costs for the different physical forms are difficult to obtain. Moreover, it is not the function of this paper to furnish a cost analysis. However, the heads of the Systems Office and the Catalog Departments at UCB furnished a few examples of readily available unit cost figures as of June, 1974 for this section and subsequent ones. All labor costs have been omitted. In the preparation of records by typing or keying and editing, labor costs are similar for all four forms of the catalog. Editing of cards of the retrospective catalog, prior to photoduplication or conversion to machine readable form is a very expensive undertaking. See related sections: USEFULNESS OF LC CATALOGING DATA BASES, UPDATING AND FILE MAINTENANCE.

CARD CATALOG

1. Retrospective catalog:

   Usually an existing card catalog is retrospective; hence conversion to another physical form is not necessary.

2. Equipment and facilities:

   Special equipment is required for the production of cards by xeroxing Depository Catalog cards, enlarging and duplicating National Union Catalog entries, or producing cards from MARC tapes or typed copy. Special storage cabinets are required. COSTS: Storage cabinet, wood, 72 trays, $1200.

3. Materials:

   Printed cards may be purchased from the Library of Congress or other distributors. Card stock must be available for original cataloging, as well as for xeroxing and duplicating other cataloging data sources. (Paper costs are rising rapidly now.) COSTS: Depository card set: no charge; LC card set, 35¢; card stock: six up sheet, 6000 sheets, $38.40 per thousand; xeroxed card, 1 - 2¢ per card.

4. Labor:

   Human labor is required for producing catalog cards by transfering data from worksheets (editing and typing), by xeroxing and duplicating

PRODUCTION COSTS...continued
Card catalog

data from other sources, or by modifying printed cards or cards produced from MARC tapes. Sorting and filing of catalog cards is a major labor cost, which tends to increase with the size of the catalog and the number of alphabets into which cards must be filed.

5. Multiple copies:

Production of multiple sets of individual cards is relatively low in cost. Distribution costs, while low for individual card sets, may be considerable over time due to the volume of the catalog.

BOOK CATALOG

1. Retrospective catalog:

Usually the catalog already exists in card form; hence, for the photoduplicated catalog, only filming, printing and binding costs are significant. For the photocomposed catalog, cataloging data must be converted into machine readable form. While very costly, this is a one time expenditure, which may be apportioned over time or shared by a cooperative system.

2. Equipment and facilities:

For the photoduplicated book catalog, cameras and film processing equipment are necessary. For the photocomposed book catalog, computer and input equipment are required. In most cases, it is preferable to have these catalogs produced by a commercial service, as well as have the printing and binding contracted out. COSTS: Photocomposed: usually, at least $1.50 per page for the initial copy for photocomposition and plates.

3. Materials:

At present, paper costs are rapidly rising. For the photoduplicated catalog, it is assumed that a card catalog already exists. However, if this catalog is to be updated by supplements and cumulations, then interim records for newly processed titles may be kept on cards. For the photocomposed catalog, typography (choice of type font and size) affects costs.

4. Labor:

For the photoduplicated catalog, human labor is necessary for the filming and developing processes. For the photocomposed book catalog, programming, a one time process, and keying and editing which are continuing processes, are extremely costly. Note, each record is keyed only once.

5. Multiple copies:

While the production of the initial copy is expensive, additional copies which involve mainly printing, binding, and paper costs, are

PRODUCTION COSTS...continued
Book catalog

much less. Distribution costs may be high due to the bulk of the catalog.

MICROFORM CATALOG

1. Retrospective catalog:

   Usually the catalog already exists in card form; hence, for the photoduplicated catalog, only filming costs are major. For the COM produced catalog, cataloging data must be converted into machine readable form. This is a one time expenditure, which, though very expensive, might be apportioned over time or shared by a cooperative system.

2. Equipment and facilities:

   For the photoduplicated microform catalog, cameras and film processing equipment are necessary. For the COM produced catalog, computer time and input equipment are required. In most cases, it is preferable to have these catalogs produced by a commercial service. Special protective storage cabinets are required, for archival copies. COSTS: COM service bureau, microfiche master, 42x, 207 frames at least $1.25, 9¢ per additional copy.

3. Materials:

   For the photoduplicated microform catalog, it is assumed that a card catalog already exists. However, if this catalog is to be updated by supplements and cumulations, then interim records for newly processed titles may be kept on cards. For the COM produced catalog, typography (choice of type font and size) affects costs in terms of the number of microfilm and microfiche units required. The cost of the film is related to the size of the file, which is usually based on a per frame cost. Cartridges and cassettes for microfilm, and cartridges and jackets for microfiche are additional one-time expenses. COSTS: Film is typically 2¢ a frame, fiche is 1¢ a frame. There may be a per fiche or per reel charge.

4. Labor:

   For the photoduplicated catalog, human labor is necessary for the filming and developing processes. For the COM produced catalog, programming, a single time expense, and keying and editing which are continuing processes are high cost factors. Note, each record is keyed only once.

5. Multiple copies:

   Production of multiple copies is much less expensive than for book or card catalogs. Each additional copy costs the same; the price is not in lots as with the book catalog. Mailing costs are low, with that of microfiche being less than microfilm.

PRODUCTION COSTS...continued

ON-LINE CATALOG

1. Retrospective catalog:

   Usually the catalog already exists in card form; hence, the cataloging data must be converted into machine readable form. This is a one time expenditure, which is very expensive, but may be apportioned over time or shared by a cooperative system.

2. Equipment and facilities:

   Computer time, input devices, and telephone lines are costly items. Disk packs are also required. COSTS: Disk pack, $100 - 150. Magnetic tapes, $10. These are standard prices. Means of keyboarding, typewriter for optical scanning, purchase price $500, on-line terminal, average lease @ $100 per month.

3. Materials:

   No materials are needed unless paper outputs in special form are desired.

4. Labor:

   Major cost aspects include programming, a one time process. Keying and editing are continuing processes. Note, each record is keyed only once. Packaged programs may be available; however, these would probably have to be modified, resulting in programming costs. Computer costs tend to be decreasing while the cost of human labor is increasing.

5. Multiple copies:

   The data base may be copied onto magnetic tapes for distribution. Mailing costs may be high. In addition, subscribers may need to modify the tapes to ensure compatibility with their systems.

UPDATING AND FILE MAINTENANCE

This section pertains to the general problems of updating and file maintenance of catalogs - the addition of new records, withdrawals and revisions of existing records - a continuous process. It is not concerned with the implementation of major changes in cataloging rules and practices, such as the abandonment of superimposition, overhauling of the LC subject heading structure, etc., as mentioned in the INTRODUCTION.

Present card catalogs, particularly those in large research and public libraries, are so huge and complex that maintenance and updating are fast becoming very time-consuming and expensive activities, particularly with the rise in labor costs. At present, when no catalog of a size comparable to the enormous card catalogs of our large research libraries exists in photocomposed book form, microform, or on-line, it is difficult to state with confidence, how costly continuous revision and updating of these other forms would be, if they, too, were as large. See related sections: USEFULNESS OF LC CATALOGING DATA BASES, PRODUCTION COSTS.

CARD CATALOG

The card catalog has the potential of oeing current, (updating and revision are by accretion), given the staff's processing speed and accuracy. This form lends itself to quick minor revisions and updatings, (e.g., withdrawals, corrections, addition of new records, etc.) by typing and subsequently filing individual cards. The growth of card catalog files has served as a deterrent to implementing extensive revisions, however, and even normal maintenance is expensive in terms of human labor. Rapid growth of the files may require frequent shifting of cards and trays, an additional expense.

BOOK CATALOG

The book catalog is out-of-date as soon as printed. The photoduplicated book catalog is updated with supplements and periodic in toto revisions. However, with large book catalogs, such as those of the British Museum and the LC-NUC series, in toto revisions are prohibitive. The book catalog may also be manually annotated; but in general, erroneous information is "frozen in". (Unless defaced and deteriorated cards are restored, their blemishes are also "frozen in".) Because this catalog file exists initially in card form, all the problems associated with the card catalog may also apply here. Interim records in some form for newly processed titles may be necessary depending on the frequency of supplement issues.

Some of the problems of updating and revision associated with the photoduplicated book catalog, also apply to the photocomposed book catalog. However, because the data is in machine readable form, supplements may be issued frequently enough (daily, weekly, monthly as computer printouts), to serve as interim records. Thus, this form

UPDATING...continued
Book catalog

with its supplements is more current than the photoduplicated book catalog. As a substitute for periodic in toto revisions, the New York Public Library uses a system of cyclic revisions of small portions of the alphabet with a supplement for the portions that are not revised in toto that month. With this cyclic system of cumulations, there are never more than two alphabets of the book catalog to check. In addition, this catalog has the potential of adapting to major changes in rules by automatic revision, if suitable programs are available.

MICROFORM CATALOG

This catalog is out-of-date as soon as filmed and must be updated by supplements and periodic in toto revisions. Obviously, it cannot be manually annotated as are book catalogs. Erroneous information, as well as defaced and deteriorated cards may be "frozen in". Because this catalog exists initially in card form, all the problems associated with the card catalog may also apply here. Supplements and in toto revisions are not as expensive as those for book catalogs, however; hence, they may be issued more frequently. Depending on the frequency of supplement issues, interim records of newly processed titles in some form for public use may be necessary.

The COM produced book catalog may also be updated with supplements and periodic in toto revisions, but not manual annotations as in book catalogs. Because the data is in machine readable form, supplements may be issued frequently in microform or as computer printouts to serve as interim records. Thus, the COM produced catalog is more current than the photoduplicated microform catalog. This catalog form also has the potential of adapting to major changes in rules through automatic revision, if suitable programs are available.

ON-LINE CATALOG

This catalog, which is in machine readable form, is the most current, depending on the staff's processing speed and accuracy. Data may be input and corrected on-line. No supplements or interim records are required. Because data is in machine readable form, changes may be made automatically, if suitable programs are available.

SPACE REQUIREMENTS: STORAGE AND USE

In this section, the space required for both storage and use of the catalog is discussed. The amount of storage space is contingent on the volume of the data base media, as well as the size of the protective containers, e.g. boxes, cabinets, shelves, tables.

To determine use space requirements, the following factors must be taken into consideration: (1) the amount of the alphabet contained in one tray, or one book volume, or one microfilm or microfiche unit, (2) the number of users who may be accommodated by the system simultaneously, (3) the number of multiple copies of the catalog required, (4) the number of reader devices (e.g., microform readers, terminals), and/or worktables or desks and chairs required, and (5) the amount of time each user will spend at the catalog. This last factor, time spent at the catalog, is dependent on the complexity of the user's query, the competency of the user with respect to cataloging practices and use of reader equipment, and the complexity of the section of the catalog file in use. According to Lipetz's study at Yale University, the majority of users spent an average of either 2 to 3 minutes or 6 to 7 minutes at the card catalog during one visit. See related sections: USER ORIENTATION AND EASE OF USE, ACCESS COSTS.

CARD CATALOG

1. Storage space:

   The storage space occupied by card catalogs is very extensive and tends to expand relatively rapidly. Usually only one copy of the complete catalog is available in a single location, though individual cards may be duplicated for other locations.

2. Use space:

   A tray may contain only a small portion of the alphabet; hence, the card catalog allows for many users at the same time, assuming that they are interested in different portions of the alphabet. However, space required for use is extensive. Room for standing and work space in the form of low catalog cabinets, worktables, chairs or pull-out shelves must be provided.

BOOK CATALOG

1. Storage space:

   The book catalog may occupy a relatively small amount of shelf space when not in use. However, voluminous book catalogs such as the British Museum or LC-NUC catalogs consume large amounts of shelving, particularly when multiple sets are required.

2. Use space:

A large part of the alphabet may be contained in one volume. To relieve congestion, multiple sets in adjacent locations may be necessary to accommodate many users simultaneously. In addition, work space (counters, tables, chairs, etc.) must be provided, as well as photocopying equipment. (Ellsworth, in commenting on the direct computer printout catalog at UC Santa Cruz, observes that when multiple sets of the catalog are kept open, they occupy as much space as would a card catalog.)

MICROFORM CATALOG

1. Storage space:

In comparison with card and book catalogs, the microform catalog occupies a very small amount of storage space, whether in single or multiple copies.

2. Use space:

A large part of the alphabet may be contained in one microfilm or microfiche unit. To relieve congestion, multiple copies, as well as reader tables and chairs must be provided to accommodate many users simultaneously. This is true whether the complete alphabet is contained on fiche or cartridges beside each reader or if only a portion of the alphabet is "locked in" to each reader. If users have problems with reader equipment, congestion may ensue. Sufficient electrical outlets must be available for reader equipment.

ON-LINE CATALOG

1. Storage space:

With present day computers, it is highly unlikely that a library will have its own computer. Hence, the computer and its auxillary equipment will be located in an area remote from the library, i.e., outside the confines of the library building. Disks are also stored at the computer center. Therefore, storage space in public service areas is not a problem with this system.

2. Use space:

Space must be provided for terminals and chairs to accommodate many users simultaneously to avoid queuing. If users have problems with terminals or the query program, or the system breaks down, congestion may result. Sufficient electrical outlets must be available for the terminals.

ACCESS COSTS

Access costs refer to the costs to process a request against the catalog data file. In this section, these costs include those of staff time to perform searches and aid or train patrons, those of furnishing reader equipment (e.g., microform readers, on-line terminals), as well as time required by patrons to search the file, and time required by mechanized searching devices (computer time) to search and display records.

At present, there is little data available on the comparative searching time required for the various physical forms of the catalog. The cost of access time may be translated into monetary terms, at which point it becomes a question of who shall pay the access cost, the patron or the system. In those institutions which charge the user for searching service, the fee may also include other costs such as production and file maintenance and updating. Usually, the system, at its own cost, provides staff to aid the patron or to do the search. See related section: USER ORIENTATION AND EASE OF USE.

CARD CATALOG

The cost of searching the data base is usually borne by the user in terms of his/her time and effort, both mental and physical.

BOOK CATALOG

The cost of searching the data base is usually borne by the user in terms of his/her time and effort, both mental and physical.

MICROFORM CATALOG

The cost of searching the manually accessed data base is usually borne by the user in terms of his/her time and effort, both mental and physical. For files which are to be automatically accessed, the system must supply the necessary mechanized access devices. In addition, the system may provide, at its own cost, staff to help the patron in using the reader equipment. COSTS: typical microfiche readers from $130 (manual) - $3000 (motorized); microfilm readers from $250 (manual)- $2000 (motorized).

ON-LINE CATALOG

The costs of searching the data base involves the user's time and effort to translate the query into the language acceptable by the computer query program, as well as the computer time required to manipulate and display the record. Terminals must be provided. Additional costs to the system may ensue from supplying staff to help patrons or developing programs to train them. It is becoming more common, and often necessary, for automated bibliographic data retrieval systems to charge users for system services. COSTS: CRT and typewriter terminals may be leased at $100 per month.

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